

REMARKS

Claims 1-24 are pending. Reconsideration and allowance in view of the following remarks are respectfully requested.

**Applicants have not received the initialed, signed and dated PTO-1449 submitted with the application on August 27, 2003. The Examiner is respectfully requested to initial the references, sign and date the PTO-1449 and return a copy to the undersigned in accordance with MPEP §609.**

Claims 1, 2, 5, 8, and 18-24 were rejected under 35 U.S.C. §102(b) over van den Brink et al. (U.S. Patent 5,481,362) and claims 3, 4 and 9-17 were rejected under 35 U.S.C. § 103(a) over van den Brink et al. The rejections are respectfully traversed.

Claim 1 recites an alignment tool comprising a substrate configured to hold a substrate having a substrate mark. The substrate mark is at a different level from the rest of the surface of the substrate. An alignment system is configured to detect alignment between a reference mark and the substrate mark using an alignment beam of radiation. An optical element is adjustably positionable in the path of the alignment beam to adjust the focal plane of the alignment system to focus on the substrate mark at the different level from the rest of the surface of the substrate.

Claim 20 recites a lithographic projection apparatus including an alignment tool including an alignment system configured to detect alignment between a reference mark and a substrate mark using an alignment beam of radiation, wherein an optical element is adjustably positionable in the path of the alignment beam to adjust the focal plane of the alignment system to focus on the substrate mark at a different level from the rest of the surface of the substrate.

Claim 22 recites an alignment method comprising, *inter alia*, adjusting the focal plane of an alignment beam to focus on a substrate mark at a different level from the rest of the surface of the substrate by interposing an optical element into the alignment beam while detecting alignment.

Claim 23 recites a device manufacturing method comprising, *inter alia*, of an alignment beam to focus on a substrate mark at a different level from the rest of the surface of the substrate by interposing an optical element into the alignment beam while detecting alignment.

The Examiner apparently has two interpretations of the disclosure of van den Brink et al. The first interpretation is that the wedge WE<sub>2</sub> corresponds to the claimed optical element that is adjustably positionable to adjust the focal plane of the alignment system to focus the substrate mark at a different level from the rest of the surface of the substrate. The second interpretation is that adjustment of the plane-parallel plate 61 will inherently result in the adjustment of the focal plane of the alignment system. It is respectfully submitted that both interpretations are incorrect.

It is first respectfully noted that the drawings of van den Brink et al. are schematic, and as such, the alignment marks P<sub>1</sub> and P<sub>2</sub> on the substrate W are on the surface of the substrate W, not a different level from the rest of the surface of the substrate W. Accordingly, the Examiner's determination that one of ordinary skill in the art would have been motivated to adjust the focal plane of the alignment system of van den Brink to a different level than the surface of the substrate W is incorrect. The disclosure of van den Brink et al. is to focus the alignment beams b, b' on the surface of the substrate W.

As clearly disclosed in column 13, lines 45, wedge-shaped elements WE<sub>1</sub> and WE<sub>2</sub> are arranged under the mask alignment marks M<sub>1</sub> and M<sub>2</sub>, which elements deflect the chief rays of the alignment beams b<sub>1</sub>' and b<sub>1</sub> from the substrate alignment marks P<sub>1</sub> and P<sub>2</sub> in such a way that these chief rays are perpendicular to the mask plate MA. There is no disclosure or suggestion that the wedge-shaped elements are, or even can be, used to adjust the focal plane of the alignment system to focus on the substrate mark at a different level from the rest of the surface of the substrate. The wedge shaped elements merely direct the chief rays of the deflected alignment beams perpendicular to the mask plate MA.

van den Brink et al. do disclose in column 14, lines 43-45, that other elements, such as a mirror or lens, may be used to direct the chief rays of the deflected alignment beams perpendicular to the mask plate, but there is no disclosure or suggestion by van den Brink et al. of a "change of WE2 which will result in focal plane change due to the thickness/shape change" as alleged by the Examiner on page 3, lines 4-5. There is no disclosure or suggestion by van den Brink et al. of changing the shape or thickness of the wedge shaped elements to adjust the focal plane of the alignment system to focus on the substrate mark at a different level from the rest of the surface of the substrate.

With respect to the plane-parallel plate 61, van den Brink et al. disclose in column 13, lines 57-59, that adjustment of the plates 61, 61' realizes precision adjustment of the direction of the alignment beam. However, as clearly shown in Figures 9 and 10, it is the lens PL<sub>1</sub> of

the projection system PL that focuses the alignment beams b, b' on the substrate marks P<sub>1</sub>, P<sub>2</sub>. There is no disclosure or suggestion by van den Brink et al., expressly or implicitly/inherently, that adjustment of the direction of the alignment beams b, b' by the plates 61, 61' will adjust the focal plane of the alignment system to focus on the substrate mark at a different level from the rest of the surface of the substrate. Moreover, as discussed above, the substrate alignment marks are on the surface of the substrate W, so one of ordinary skill in the art would not have been motivated to adjust the focal plane of the alignment system to a different level.

With respect to the Examiner's assertions on page 5, paragraph numbers 12 and 13, that it is well known to change the refractive properties of optical elements, the undersigned respectfully requests that the Examiner provide some support for such conclusions. Although unstated, it appears that the Examiner is relying on Official Notice for such assertions. To the extent that such is the case, the Examiner is respectfully requested to provide documentary evidence in the next Office Action as required by MPEP 2144.03. However, as discussed above, even if the Examiner produces such documentary evidence, there is still no disclosure or suggestion by van den Brink et al. of changing the shape, thickness, position, etc. of either the wedge shaped elements or the plates, nor would one of ordinary skill in the art have been motivated to as neither of these elements is provided to adjust the focal plane of the alignment system to focus on the substrate mark at a different level from the rest of the surface of the substrate.

With respect to the Examiner's reliance on the "design choice" motivation, it is respectfully submitted that Applicants have disclosed several embodiments and rationale for the adjustment of the focal plane of the alignment system to a different level from the rest of the surface of the substrate, none of which are disclosed or suggested by van den Brink et al., or any of the other prior art of record, and none of which are a "design choice."

Claims 2-19, 21 and 24 recite additional features of the invention and are allowable for the same reasons discussed above and for the additional features recited therein.

Reconsideration and withdrawal of the rejection of claims 1-5 and 8-24 over van den Brink et al. are respectfully requested.

Applicants appreciate the indication that claims 6 and 7 define patentable subject matter. However, in view of the above remarks, Applicants respectfully submit that all the claims are allowable and that the entire application is in condition for allowance.

Should the Examiner believe that anything further is desirable to place the application in better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

PILLSBURY WINTHROP SHAW PITTMAN LLP

  
JOHN P. DARLING  
Reg. No. 44482  
Tel. No. (703) 770-7745  
Fax No. (703) 770-7901

Date: June 9, 2006

P.O. Box 10500  
McLean, VA 22102  
(703) 770-7900